

DISCUSSION OF THE AMENDMENT

The specification has been amended by correcting a clear error at page 3.

The specification has been further amended by inserting the pages missing from the English translation of the international application.

According to 35 U.S.C. 371(c) and 37 C.F.R. 1.495(c), Applicants entering the national stage in the United States are required to file an English translation of the international application if the international application was filed in another application and was not published under PCT Article 21(2) in English. Thus, the present national stage application is such an application. See also M.P.E.P. 1893.01(d). As confirmed therein, the translation **must** be a translation of the international application as filed or with any changes which have been properly accepted under PCT Rule 26 or any rectifications which have been properly accepted under PCT Rule 91 (emphasis added). Accordingly, the insertion of pages 8-13 is necessary to comply with 35 U.S.C. 371(c) and 37 C.F.R. 1.495(c).

Claim 1 has been amended from passive to active form; by inserting antecedent basis for later claims; and by deleting the redundant term “optionally pretreated”. Claim 7 has been amended from plural to singular format. Claims 2, 3 and 8-10 have been amended to clarify Markush language. In addition, Claim 9 has been amended to delete glutaric acid and adipic acid. Claims 11 and 12 have been amended for antecedent basis purposes.

No new matter is believed to have been added by the above amendment. Claims 1-20 remain pending in the application.

REMARKS

The rejection of Claims 1-6 and 13-20 under 35 U.S.C. § 102(a or e) as anticipated by or, in the alternative, under 35 U.S.C. § 103(a) as obvious over, US 2003/0195115 (Mizobuchi et al), is respectfully traversed.

As recited in above-amended Claim 1, an embodiment of the present invention is a catalyst comprising from 0.1 to 20% by weight of rhenium and from 0.05 to 10% by weight of platinum, based on the total mass of the catalyst, on a support, obtainable by a process comprising a) treating the support with a solution of a rhenium compound; b) drying the treated support, and then heat treating the dried support in a reductive atmosphere at from 80 to 600°C thereby forming a catalyst blank; and c) impregnating the catalyst blank with a solution of a platinum compound and then drying.

Mizobuchi et al discloses a catalyst for removing carbon monoxide (CO) in a hydrogen rich gas according to a water gas shift reaction, wherein the catalyst is a combination of platinum and rhenium on a rutile titania support, which catalyst may be prepared by a number of alternative methods relating to the order of addition, if any, of rhenium and platinum to the support, wherein the most preferred method is adding the rhenium first, and the platinum second [0029]. In the method, an aqueous solution of a rhenium salt is added to rutile titania, water is evaporated, and the product is dried by heating; subsequently, an aqueous solution of a platinum salt is added to the supported rhenium, water is evaporated, the product is dried by heating; and finally, the rutile titania supporting platinum and rhenium thereon is pulverized and calcined [0026]-[0027]. Mizobuchi et al discloses further, as an introduction to the examples therein, heating the catalyst to a temperature of 500°C in one hour in a flow of a hydrogen rich gas and kept at the temperature for one hour to carry out a reduction treatment [0040]. Mizobuchi et al discloses further that, as shown in Fig. 5 therein, by adding rhenium and platinum in that order to the support, as

opposed to the opposite order or at the same time, the highest catalyst performance (CO conversion) at the reaction temperatures of 200°C and 250°C is obtained [0054].

The Examiner finds that while the process recited in the present claims is different from that disclosed by Mizobuchi et al, in effect, there would appear to be no difference in the presently-claimed catalyst and the catalyst of Mizobuchi et al.

In reply, it is respectfully submitted that the reduction treatment of the catalyst disclosed by Mizobuchi et al [0040] is a conventional activation treatment of a catalyst prior to use, as recited in, for example, presently-recited Claim 6. However, Mizobuchi et al does not disclose heat treating in a reductive atmosphere following application of their rhenium compound and prior to application of their platinum compound. As supported by the newly-submitted Urtel Declaration, this step of the present claims produces a catalyst that is different from that of Mizobuchi et al. As explained by Dr. Urtel, after step b) of the present claims, i.e., drying and heat treatment in a reductive atmosphere, rhenium is in oxidation state (0), present as metallic rhenium. This is an important precondition to facilitate excellent formation of an alloy when the platinum compound is added according to step c). Bonding of the metals to each other and the support is improved. If step b) is omitted, then rhenium will be washed out at least partly when the support is impregnated with the solution of the platinum compound in step c). Performance of such a catalyst in hydrogenation processes would be poor. In addition, activation of the catalyst prior to its use does not further change the oxidation state of the rhenium but only of the platinum which is present on the catalyst surface. The platinum cations are reduced. Rhenium is after step b) present as metallic rhenium and is not altered further except if the catalyst blank is passivated after step b) as recited in, for example, present Claim 5. Such passivation partially oxidizes the rhenium, leading to a thin layer of rhenium oxide on the rhenium surface and prevents self-heating of the catalyst and ensures a safer handling thereof.

In sum, the Urtel Declaration establishes a significant difference between the presently-claimed catalyst and the catalyst of Mizobuchi et al. There is no suggestion or motivation in Mizobuchi et al to insert a preliminary heat treatment in a reductive atmosphere step between the successive applications of the rhenium compound and the platinum compound.

For all the above reasons, it is respectfully requested that this rejection be withdrawn.

The rejection of Claims 7-12 under 35 U.S.C. § 103(a) as unpatentable over Mizobuchi et al in view of WO 01/64338 relying on its US equivalent, US 2003/0114719 (Fischer et al), is respectfully traversed. The disclosures and deficiencies of Mizobuchi et al have been discussed above. Fischer et al does not remedy these deficiencies. Fischer et al discloses a process for preparing alcohols by catalytic hydrogenation of carbonyl compounds over a catalyst comprising rhenium and platinum on an activated carbon support [0012]. The Examiner holds that it would have been obvious to use the catalyst of Mizobuchi et al as the catalyst in the hydrogenation process of Fischer et al, in view of the common use of catalysts containing rhenium and platinum.

In reply, even if the catalyst of Mizobuchi et al were used in the process of Fischer et al, the result would still not be the presently-claimed invention, for reasons discussed above with regard to the rejection over Mizobuchi et al.

In addition, the advantage disclosed by Mizobuchi et al with regard to order of addition of the rhenium and platinum compound is specifically tied to the water gas shift reaction disclosed therein. It is well-known that such a reaction is simply the reaction of CO and H<sub>2</sub>O to yield CO<sub>2</sub> and H<sub>2</sub>. However, it cannot be assumed that such order would have an effect when the catalyst is used for a completely different process, such as the process of Fischer et al. The specification herein contains comparative data demonstrating the importance of order of addition of the presently-recited rhenium and platinum compounds.

Catalysts C2, C4 and C6 are comparative catalysts. Comparative catalyst C2 exemplifies the rhenium and platinum compounds applied simultaneously, followed by reduction. Comparative catalyst C4 reverse the presently-recited order of rhenium compound followed by platinum compound, with heat treatment in a reductive atmosphere of the platinum compound. Comparative catalyst C6 is similar to comparative catalyst C4 with regard to the order of addition of the platinum and rhenium compounds. Catalyst B, and other exemplified catalysts ending with a letter, i.e., catalysts A, D, E and F, are according to the presently-claimed invention.

Examples 5 and 6, which employ catalyst B, can be compared to Comparative Example 3, which employs comparative catalyst C2. The results are shown in Table 2 and Table 4, respectively. The yield of the desired product 1,4-butane diol (BDO) is manifestly greater for the inventive catalyst B (91.4% and 91.1%) than for the comparative catalyst C2 (19.7%). Similarly low BDO yields were 15.3% using comparative catalyst C4, as demonstrated in Comparative Example 5, as shown in Table 5; and 34.5% using comparative catalyst C6, compared to much higher BDO yields for Examples 12 and 13, as shown in Table 8.

The above-discussed results could not have been predicted by the combination of Mizobuchi et al and Fischer et al.

For all the above reasons, it is respectfully requested that this rejection be withdrawn.

The rejection of Claims 1-20 under 35 U.S.C. § 112, second paragraph, is respectfully traversed. Indeed, the rejection would now appear to be moot in view of the above-discussed amendment. Accordingly, it is respectfully requested that the rejection be withdrawn.

The objection to the drawings would now appear to be moot in view of the above-discussed amendment, which inserts the missing pages from the English translation from the

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international application. Accordingly, it is respectfully requested that the objection be withdrawn.

The objection to the specification with regard to the missing pages is now moot in view of the above-discussed amendment. Accordingly, it is respectfully requested that the objection be withdrawn. See the discussion in the Discussion of the Amendment section of this amendment why insertion of the missing pages herein is both appropriate and mandated.

All of the presently-pending claims in this application are now believed to be in immediate condition for allowance. Accordingly, the Examiner is respectfully requested to pass this application to issue.

Respectfully submitted,

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## APPENDIX